6. CONCLUSIONS
6. CONCLUSION

Due to indiscriminate and non-judicial use of antibiotics it has resulted in the development of resistance to almost every old and new antibiotics among bacterial population. Further, presence of resistance plasmid and transposon in bacterial population, the emergence and spread of multiple drug resistance will be an alarming situation in near future. In many cases antimicrobial drugs does not find suitable place in chemotherapy due to their toxicity. Thus, management of infectious diseases should follow a uniform policy of antibiotic use after knowing the resistance status of microbial population in particular area. Use of non-microbial drugs of plant origin should be used whenever feasible to avoid excess use of antibiotics and toxicity problem. The present study revealed that medicinal plants may play very important role in management of infectious diseases through an integrated approach of modern and traditional systems of medicine. The study further stresses to continue search of new antimicrobials of plant origin against various infectious microorganisms of human and veterinary origin specially against multiple drug resistant pathogens. The findings of this investigation may be concluded as follows:

1. The antimicrobial screening showed that out of 82 plant extracts, 56 ethanolic extracts, 13 aqueous and 5 hexane extracts demonstrated antimicrobial activity against one or more organisms. This indicated that ethanol will be a better solvent to isolate antibacterial and antifungal principles than aqueous and hexane extracts.

2. Five ethanolic plant extracts (*Emblica officinalis, Terminalia chebula, Terminalia belerica, Plumbago zeylanica* and *Holarrhena antidysenterica*) showed outstanding antimicrobial activity in which extract of *Emblica officinalis* is the most active showing lowest MIC followed by the order of *Terminalia chebula, Holarrhena antidysenterica, Plumbago zeylanica* and *Terminalia belerica*.

3. The susceptibility of the test organisms towards plant extracts followed the order of *Staphylococcus aureus* and *Staphylococcus epidermidis* > *Salmonella typhimurium* > *Pseudomonas aeruginosa* > *Bacillus subtilis* > *Escherichia coli* > *Proteus vulgaris* > *Candida albicans* > Dermatophytes.

4. Remarkable activity against majority of the test organisms was shown by the ethanolic extract of above five plants which contain phenolic compounds, tannins, steroidal alkaloid, naphthoquinone and saponins as the major bioactive compounds.
5. The most effective formulations are formulation no. 21, 24, 11, 25, 23, 22, 4 and 1 against *Staphylococcus aureus*; no. 1, 22, 4, 21, 23, 25, 11 and 24 against *Escherichia coli* and no. 21, 23, 25, 11 and 1 against *Candida albicans* as evident from their lower MICs and their lower ranks.

6. Formulations showing higher synergism index are most effective and economic, hence, if the formulation based on two constituents are to be prepared then EO&TB (formulation no. 2) against *Staphylococcus aureus*, EO&HA (formulation no. 4) against *Escherichia coli* and PZ&HA (formulation no. 10) are most effective and economic formulations. Whereas formulation based on TC&PZ (formulation no. 6) against *Staphylococcus aureus* as well as against *Escherichia coli* and TC&TB (formulation no. 5) against *Candida albicans* are the most ineffective and uneconomic formulations.

7. None of the five ethanolic extracts (*Emblica officinalis*, *Terminalia chebula*, *Terminalia belerica*, *Plumbago zeylanica* and *Holarrhena antidysenterica*) and their selective formulations showed any cell toxicity to sheep erythrocytes upto a maximum dose of 200mg/ml concentration.

8. The results validate the use of *Emblica officinalis* (fruits), *Terminalia chebula* (fruits) and *Terminalia belerica* (fruit) in cough, respiratory disorders, sore throat, diarrhoea, dysentry, eye disorders, skin diseases, boils and abscesses; *Plumbago zeylanica* (root) in skin infections to open abscesses and also in diarrhoea while *Holarrhena antidysenterica* in various gastrointestinal infections such as diarrhoea.